

Water Quality evaluation:Parameters and Testing Methods

Venkatraman S¹, Sooriya A², Sridhar P², Srihari Prasanth S², Subash R², Subash V M²

¹Assistant Professor, Department of Chemistry, Arunai College of Pharmacy, Velu Nagar, Thenmathur, Thiruvannamalai-606 603.

²Students, Arunai College of Pharmacy, Velu Nagar, Thenmathur, Thiruvannamalai-606 603.

Date of Submission: 10-07-2025

Date of Acceptance: 20-07-2025

ABSTRACT:

Water a vital resource for life, possesses unique physical and chemical properties that continue to fasciate scientists. The study examines the quality of tap and drinking water by analyzing key parameters such PH, temperature, conductivity, chloride, harness, alkalinity, and carbon-dioxide content. Standard laboratory methods were used to assess water samples, and results were compared with BIS and WHO guidelines. Findings highlight concerns of water of pollution caused by sewage and industrial waste, especially in urban areas. The study emphasizes the importance of regular monitoring to ensure water safety and public health.

I. INTRODUCTION:

Water is a unique, substance that is a major component of all living things. Its nature and properties have intrigued philosophers, naturalists and scientists since antiquity. Water continues to engage the attention of scientists today as it remains incompletely understood in spite of intense study over many years. This is primarily because water is anomalous in many of its physical and chemical properties. Some of water unique properties are literally essential for life, while other have profound effects on the size and shape of living organisms, how they work, and the physical limits or constraints with which they must operate. The more recent discipline of computer simulation has also played a role, having a level of sophistication in the study of water in which it can be used to interpret experiment and simulate properties not directly accessible by experiment.

Water pollution has many sources. The most polluting of them are the city sewage and industrial waste discharged into rivers. the facilities to treat waste water are not adequate in any city in India.

Increasing number of people requiring lot of fresh water basically for drinking or

consumption purpose. This shows that degraded water quality can contribute to water scarcity as its limits its availability for both human use and ecosystem.

The central pollution control board monitoring results obtained during 2005 indicates that organic pollution continuous to be aquatic resource

II. MATERIAL AND METHOD'S:

1.COLOR: Observation for the color of the tap water were made visually using sacchi disc.

2.TEMPERATURE: Temperature of the water samples were recorded with the help of maximum minimum thermometer reading were taken at 11 A.M and 5.00.P.M. necessary tables and histogram were prepared accordingly.

3.CONDUCTIVITY: Electrical conductivity of the water samples were determined in the laboratory with the help of systronic conductivity meter and expressed in micromhos. it gave an idea of soluble salts present in the samples.

4. PH VALUE: pH of the water samples were determined in the laboratory with the help of the systronic pH meter type 321. pH was also determined on the spot colorimetrically with the help of Lovibond comparator box using appropriate B.D.H. indicator [bromo thymol blue, phenolred]

5.CHLORIDE CONTENT: Chloride was estimated to Mohr's method titrating 50 ml of sample by silver nitrate using potassium chromate as an indicator APHA [1985]. for which 50ml of water sample in a titration flask was kept over a white paper surface. There after 2-3 drops of potassium chromate solution was added this gives yellow color to the sample and it was then titrated with 0.0141N silver nitrate solution until a color change form pure yellow to brick red and end point is reached, then bland titration was also determined by titrating distilled water in the sample way. This helped to chose the end point for the titration.

6. TOTAL HARDNESS: For determining the total hardness of water 50ml. of the water sample in a titration flask was kept on white paper. In the solution 1ml. of buffer solution [dissolved 13.5gm. ammonium chloride in 114ml. concentration of ammonium hydroxide and added 86ml. water to make the volume upto 200ml] is added then 2 drops indicator Erichrome Black T dissolved 0.5gm Erichrome Black T dye in 100ml of 80% of ethyl alcohol is added with tuned the color of the sample wine red. Finally it was titrate with the standard EDTA titrant [0.01m] slowly ,with continuous stirring until the wine red color disappeared from the solution and finally to clear blue color.

7.TOTAL ALKALINITY:Bicarbonate alkalinity together with carbonate alkalinity are called total alkalinity in this 2drops of phenolphthalein was added if pink appeared then it was titrated with 0.02N sulphuric acid till the color disappeared then 2 drops of methyl orange indicator is added to bring color yellow. Titration is then continued with same 0.02N sulphuric acid till the color change to orange if the color does not appear pink after adding phenolphthalein then 2 drops of methyl orange is added and then titrated as above. The

reading was then noted and total alkalinity was calculated by the following

Formula[APHA 1967]

8.CARBONATECONTENT: For this 50ml of water sample to kept in a conical flask and added with 2drops of phenolphthalein indicator if the water sample turned pink presence of carbonate is indicated.it is then titrated with 0.02N Sulphuric acid till the pink color disappeared and end point is noted as 'P'

9.BICARBONATE CONTENT: This method was suggested for testing bicarbonate content for water 2-3 drops methyl orange indicator was added to 50ml, same water sample after determining that carbonate contents then the sample was titrated with 0.02N sulphuric acid solution until that color changed from yellow to orange.

10.FREE CARBON-DI-OXIDE:To 50ml of water sample 2 drops of phenolphthalein indicator were added incase the color change to pink free carbon-di-oxide were taken as absent and when the sample remained colorless presence was indicator the colorless solution was titrate with standard 0.02N sodium hydroxide titrant and free CO₂.

WATER QUALITY STANDARD(BUREAU OF INDIAN STANDARD)

Parameters	Acceptable	Maximum	WHO
PH	6.5-8.5	6.5-9.5	6.5-9.5
Conductivity(at 25°C)	5.1µS/cm ⁻¹	-	-
Total Alkalinity	200 mg/l	600 mg/l	-
Total Hardness	300 mg/l	600 mg/l	-
Carbonate	75 mg/l	200 mg/l	75 mg/l
Chloride	250 mg/l	1000 mg/l	250mg/l
Bicarbonate	30	100	150
Free-Carban-Di-Oxide	-	-	-

III. CONCLUSION:

Water is vital for all forms of life and must meet quality standards to be safe for use our study revealed variations in key parameters like hardness, alkalinity, and chloride levels some samples exceed permeable limits, indicating

potential health concerns. Regular monitoring is essential to ensure safe drinking water pollution from sewage and industry remains a major threat to water quality.Awarenessand responsible water management are crucial for a healthier future.

TEST	WELL WATER	DRINKING WATRE	PURIFIED WATER
APPEARANCE			
COLOR	Clear	Clear	Clear
ODOUR	Characteristic	Characteristic	Characteristic
TASTE	Tasteless	Tasteless	Tasteless
TEMPERATURE	27.6°C	28.3°C	28.3°C
INSTRUMENTAL TEST			
CONDUCTIVITY (at 25°C)	0.162 $\mu\text{S}/\text{cm}^{-1}$	0.169 $\mu\text{S}/\text{cm}^{-1}$	0.169 $\mu\text{S}/\text{cm}^{-1}$
PH	7.5	7.9	7.5
CHEMICAL TEST			
TOTAL HARDNESS	350 mg/l	160 mg/l	100 mg/l
TOTAL ALKALINITY	384 mg/l	320 mg/l	580 mg/l
CHLORIDE	139 mg/l	135 mg/l	39 mg/l
CARBONATE	0	30 mg/l	0
BICARBONATE	370	300	60
FREE CARBON-DI-OXIDE	0	0	0

REFERENCE:

- [1]. Pharmaceutical analysis
Author: Anees ahmad Siddiqui
Edition: 2020pg:61
- [2]. Pharmaceutical analysis
Author: Dr.G..Devala Rao
Edition: 2018 pg:137,169
- [3]. Pharmaceutical analysis
Author: Dr.S.B.Bari, Dr.L.V.Sonawane
, Dr.B.N.Poul, Mrs.D.N.Bhirud
Edition: 2018 pg:30
- [4]. USP Vol-2 pg -4653 Edition -2022
- [5]. BP Vol-2 pg -1286 Edition-2022
- [6]. IP Vol-3 pg-3516 Edition -2022
- [7]. Physicalk-chemical parameters for testing of water -A review Varsha nigam, Neelam behi, M.C.Kanchan
- [8]. Guru nanak Khalsa collage Yamuna nager./JPBS/Volume3/ issue 3/Edition:2013 pg:523-527
- [9]. WHO Geneva,[2008], Guidelines for drinking water quality [electronic resource],3rd edition incorporating 1st and 2nd addenda, volume 1, recommendation.
- [10]. Rout chadetri, Sharma arabinda, Assement of drinking water quality:A case study of ambala cantonment area, Haryana,India, International journal of environment science volume-2, pg, no- 2011